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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/734,816	12/12/2003	Steven A. Soper	Soper 0023.1	3513

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PATENT DEPARTMENT
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EXAMINER	
LEE, SIN J	
ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
07/14/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/734,816	SOPER ET AL.	
	Examiner	Art Unit	
	Sin J. Lee	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 June 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-14 and 16* is/are rejected.

7)☒ Claim(s) *3 and 15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. In view of applicants' argument, previous 102(b) rejection on claims 1, 2,4-11, 14 and 16 over Vaidya et al ("Photoresist-free Micropatterning of Polymer Surfaces Used in Microanalytical Devices", presentation, Micro Total Analysis Systems (November 2002), pg.1-3) is hereby withdrawn.

2. Due to newly cited prior arts, the following rejections are made non-final.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 1, 2, 4-11, 13 and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Brandow et al (US 6,436,615 B1).

In Fig.2, Brandow teaches the following; First, by imagewise exposure to 193 nm radiation, the polymer having 3-chloromethyl*phenyl* group is oxidized to have –COOH groups in the exposed portions. Further steps such as grafting of ligand Q-Z and EL *Ni* deposition follow (see also, col.4, lines 66-67, col.5, lines 1-45). Brandow teaches (col.5, lines 32-39) that the preferred exposure sources are excimer lasers operating

under *ambient* conditions. Since Brandow teaches that the material remaining in the irradiated regions are oxidized species such as carboxylic acid groups, it is the Examiner's position that Brandow teaches present step of selectively exposing the polymer in an oxidizing atmosphere to actinic light. Brandow teaches that Q (a group possessing the appropriate combination of physical and chemical properties required for the application) can include single strand DNA sequences (col.6, lines 19-21). Brandow also teaches that (col.6, lines 28-38) Q can contain ligand groups such as thiol-, *amino*-, pyridyl-, diphenylphosphino-, or acetylacetonato- and Z can consist of aliphatic amine or alcohols. See also claim 14. Thus, Brandow teaches present inventions of claims 1, 2, 4-11, 13 and 14.

6. Claims 1, 2, 4, 11, 14 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Gudimenko et al (5,948,484).

Gudimenko teaches (see claim 1) a process for modification of a surface of a solid substrate such as organic polymers (such as polyimides or polyacrylates – see col.11, lines 7-15), the process comprising; (a) irradiation of the surface of the substrate with a does of UV radiation in the presence of oxygen, sufficient to cause the formation of reactive H groups, the reactive H groups being one or more selected from OH, OOH and *COOH*; and (b) silylation of the reactive hydrogen groups in the surface region of the substrate with silylating agent. Examples of preferred silylating agents include dimethylsilyldimethyl *amine* shown in col.5, lines 30-35. Thus, Gudimenko teaches present inventions of claims 1, 2, 4, 11, 14 and 16.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1, 2, 4-14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bilyk et al (US 6,800,331 B2).

Bilyk teaches (see abstract) a method of modifying a polymeric surface of a substrate comprising: (i) providing the polymeric surface with functional groups; and (ii) contacting the surface with (a) a polyamine compound reactive with the surface functional groups and (b) crosslinking agent reactive with the polyamine to provide a crosslinked network grafted to the substrate surface. As one of examples for the suitable polymer surfaces for the application of polyamine formulation of his invention, Bilyk includes polymer containing surface reactive groups of *carboxylic* type (see col.5, lines 48-51). Also, as one of examples for the methods to modify *at least parts* of the polymer surface to improve the interaction of the polymer surface with polyamino compounds, Bilyk teaches *UV irradiation in the presence of an oxidizing atmosphere* such as air or oxygen (see col.6, lines 8-21). Based on Bilyk's teaching, it would have been obvious to one skilled in the art to perform UV irradiation on *parts* (i.e., selective parts) of a polymer surface (as suitable polymeric materials, Bilyk includes polystyrene as well as polymethylmethacrylate – see col.5, lines 17-47) to obtain a polymer containing carboxylic groups as the functional groups so as to improve the interaction of the polymer surface with polyamino compounds. As examples for the crosslinking

agent, Bilyk include compounds containing vinyl groups susceptible to Michael addition reactions such as acryl ate, methacrylate, acrylamide, alkyl halides, alkynes etc. (see col.8, lines 15-37). Bilyk teaches that after the polyamino crosslinked interphase has been grafted to the surface of the polymer substrate, additional functional coatings can be applied (col.14, lines 3-8). Such coating can include metallic coatings such as copper, platinum, gold etch (col.14, lines 46-48). Bilyk also teaches that by using multi step surface grafting process (col.14, lines 66-67, col.15, lines 11-23), the bio-activity/bio-compatibility of polymer can be improved for binding bioactive molecules such as peptides, proteins or enzymes. Bilyk also teaches that as suitable compounds for multi step surface coupling, inorganic species such as metal oxides can be used (col.15, lines 6-15). Thus, Bilyk's teaching renders obvious present inventions of claims 1, 2, 4-14 and 16.

Allowable Subject Matter

9. Claims 3 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. None of the cited prior arts teaches or suggests the use of the visible light for the exposure step as presently claimed in claim 3, or the use of polysulfone as presently claimed in claim 15.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333. The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly, can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Sin J. Lee/
Primary Examiner, Art Unit 1795
July 10, 2008